

PLANT ITEM MATERIAL SELECTION DATA SHEET

HOP-SCO-00001 & HOP-SCO-00004 (HLW)

Thermal Catalytic Oxidizer

- Inlet Temperature (°F) (nom/max): 330/330
- Operating Pressure (in-WG) (max/min): 80/-80
- Location: outcell

ISSUED BY
RPP-WTP PDC

Contents of this document are Dangerous Waste Permit affecting

Operating conditions are as stated on sheets 4 and 5

Operating Modes Considered:

- Assume off-normal conditions same as normal operations.

Materials Considered:

Material (UNS No.)	Relative Cost	Acceptable Material	Unacceptable Material
Carbon Steel	0.23		X
304L (S30403)	1.00		X
316L (S31603)	1.18	X	
6% Mo (N08367/N08926)	7.64	X	
Alloy 22 (N06022)	11.4	X	
Ti-2 (R50400)	10.1		X

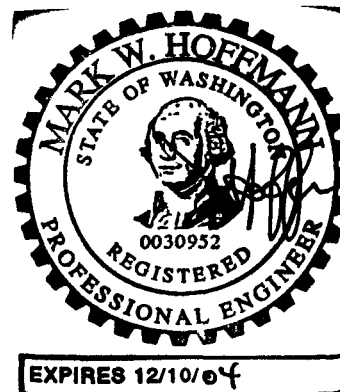
Recommended Material: 316 (max 0.030% C; dual certified)

Recommended Corrosion Allowance: 0.00 inch (includes 0.00 inch erosion allowance)

Process & Operations Limitations:

- None

Please note that source, special nuclear and byproduct materials, as defined in the Atomic Energy Act of 1954 (AEA), are regulated at the U.S. Department of Energy (DOE) facilities exclusively by DOE acting pursuant to its AEA authority. DOE asserts, that pursuant to the AEA, it has sole and exclusive responsibility and authority to regulate source, special nuclear, and byproduct materials at DOE-owned nuclear facilities. Information contained herein on radionuclides is provided for process description purposes only.



This bound document contains a total of 5 sheets.

1	9/15/04	Issued for Permitting Use			
0	9/24/02	Issued For Permitting Use	DLA	JRD	MHoffmann
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PLANT ITEM MATERIAL SELECTION DATA SHEET**Corrosion Considerations:**

The thermal catalytic oxidizers oxidize organics to carbon dioxide, water, and possibly acid gases. The equipment operates at low relative humidity.

a General Corrosion

None anticipated.

Conclusion

304L is satisfactory.

b Pitting Corrosion

Pitting corrosion will only be a concern if column is allowed to cool with the formation of moisture.

Conclusion

At the stated operating conditions, pitting corrosion is not a significant concern, but 316L is recommended for its greater resistance to pitting.

c End Grain Corrosion

None anticipated.

d Stress Corrosion Cracking

Stress corrosion cracking will only be a concern if column is allowed to have multiple cooling cycles with the formation of liquid.

Conclusion

At the stated operating conditions, pitting corrosion is not a significant concern.

e Crevice Corrosion

Crevice corrosion will only be a concern if column is allowed to have multiple cooling cycles with the formation of liquid.

Conclusion

At the stated operating conditions, crevice corrosion is not a significant concern.

f Corrosion at Welds

None anticipated.

Conclusion

Not a concern.

g Microbiologically Induced Corrosion (MIC)

Conditions in this equipment are not conducive to MIC

Conclusion

Not a concern.

h Fatigue/Corrosion Fatigue

Equipment shall be designed to accommodate the expected fatigue cycles over the 40 year design life.

Conclusion

Not a concern.

i Vapor Phase Corrosion

Offgas equipment is essentially entirely vapor space. Comments under General Corrosion apply.

Conclusion

Not a concern.

PLANT ITEM MATERIAL SELECTION DATA SHEET**j Erosion**

Velocities are not expected to be sufficient to cause concern.

Conclusion

Not a concern

k Galling of Moving Surfaces

None expected.

Conclusion

Not a concern.

l Fretting/Wear

None anticipated

Conclusion

Not a concern.

m Galvanic Corrosion

None anticipated.

Conclusion

Not a concern.

n Cavitation

None anticipated.

Conclusion

Not a concern.

o Creep

Creep is not a concern at these temperatures.

Conclusion

At the stated operating conditions, creep is not a concern.

p Inadvertent Addition of Nitric Acid

Introduction of nitric acid into the offgas stream is not a likely scenario.

Conclusion

Not applicable.

PLANT ITEM MATERIAL SELECTION DATA SHEET

OPERATING CONDITIONS

PROCESS CORROSION DATA SHEET

Component(s) (Name/ID #) Thermal catalytic oxidizer (HOP-SCO-00001, HOP-SCO-00004)Facility HLWIn Black Cell? No

Chemicals	Unit ¹	Contract Maximum		Non-Routine		Notes
		Leach	No leach	Leach	No Leach	
Aluminum	g/m ³					
HCl	g/m ³					
HF	g/m ³					
Iron	g/m ³					
NO	g/m ³	2.92E-01	3.02E-01			
NO2	g/m ³	1.07E-01	1.16E-01			
Phosphate	g/m ³					
SO2	g/m ³					
Mercury	g/m ³					
Carbonate	g/m ³					
Undissolved solids	wt %					
Other (NaMnO4, Pb,...)	g/m ³					
Other	g/m ³					
Humidity	%	0.064%	0.061%			
Temperature	°F					Note 2
List of Organic Species:						
Notes: 1. Concentrations less than 1×10^{-4} g/m ³ do not need to be reported; list values to two significant digits max. 2. Tmin not provided, Tmax 330 °F						
Assumptions						

PLANT ITEM MATERIAL SELECTION DATA SHEET**5.4.8.3 Thermal Catalytic Oxidizer (HOP-SCO-00001, HOP-SCO-00004)****Routine Operations**

The gas from the catalyst skid electric heater flows to the thermal catalytic oxidizer (TCO). The TCO oxidizes organics to carbon dioxide and water and possibly acid gases (depending on the presence of halogenated organics in the gas). The TCO operates at about the same temperature as the NO_x SCR. The TCO is placed in front of the NO_x SCR to take advantage of the decomposition reaction heat generation to maintain the NO_x SCR operating temperature, although little heat is generated. This arrangement also prevents the formation of NO_x in the TCO from the oxidation of ammonia used in the NO_x SCR. The TCO catalyst is likely to be a platinum-based material deposited on a substructure that is held in frames and is inserted and removed through access doors. This facilitates easy changeout.

This equipment is operated at low relative humidity.